United States Department of Agriculture

Natural Resources Conservation Service

Lakewood, Colorado

RWA 11020001

September 2007

Arkansas Headwaters Watershed

Hydrologic Unit Code 11020001

Rapid Assessment

Satellite Imagery: ArcIMS Server - Geographic Network Services hosted by ESRI

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Introduction

Background Information

The Natural Resources Conservation Service (NRCS) is encouraging the development of rapid watershed assessments in order to increase the speed and efficiency generating information to guide conservation implementation, as well as the speed and efficiency of putting it into the hands of local decision makers.

Rapid watershed assessments provide initial estimates of where conservation investments would best address the concerns of landowners, conservation districts, and other community organizations and stakeholders. These assessments help land-owners and local leaders set priorities and determine the best actions to achieve their goals.

Benefits of these Activities

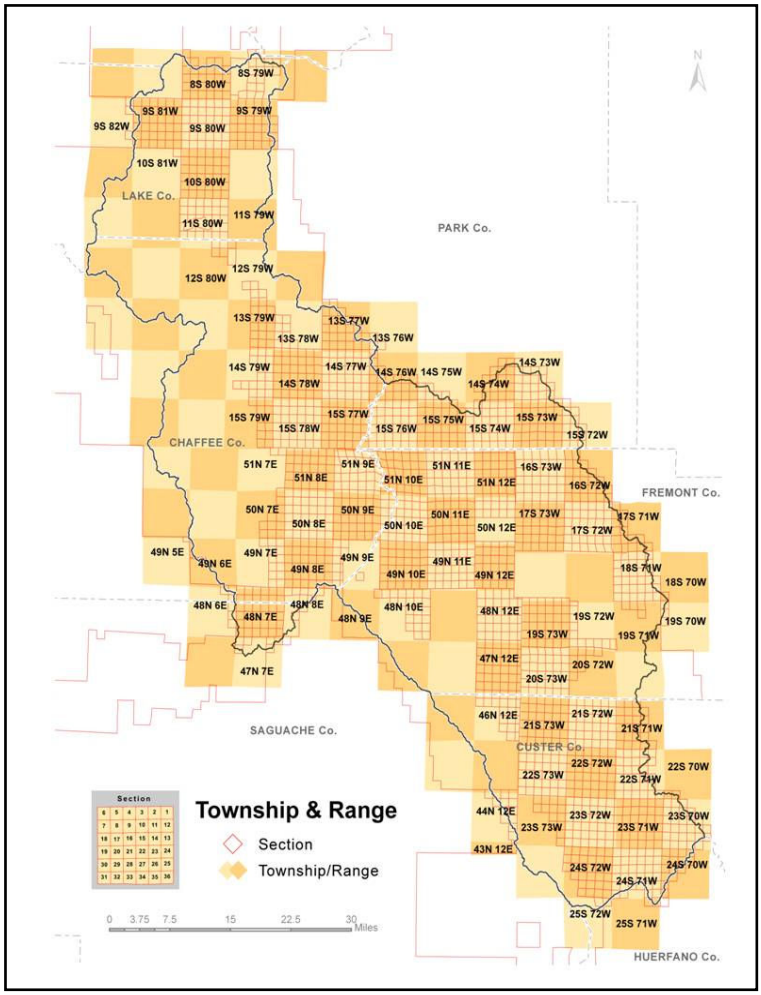
While rapid assessments provide less detail and analysis than full-blown studies and plans, they do provide the benefits of NRCS locally-led planning in less time and at a reduced cost. The benefits include:

- Quick and inexpensive tools for setting priorities and taking action
- Providing a level of detail that is sufficient for identifying actions that can be taken with no further watershed-level studies or analyses
- Actions to be taken may require further Federal or State permits or ESA or NEPA analysis but these activities are part of standard requirements for use of best management practices (BMPs) and conservation systems
- Identifying where further detailed analyses or watershed studies are needed
- Plans address multiple objectives and concerns of landowners and communities
- Plans are based on established partnerships at the local and state levels
- Plans enable landowners and communities to decide on the best mix of NRCS programs that will meet their goals
- Plans include the full array of conservation program tools (i.e. cost-share practices, easements, technical assistance)

Rapid Watershed Assessments provide information that helps land-owners and local leaders set conservation priorities.

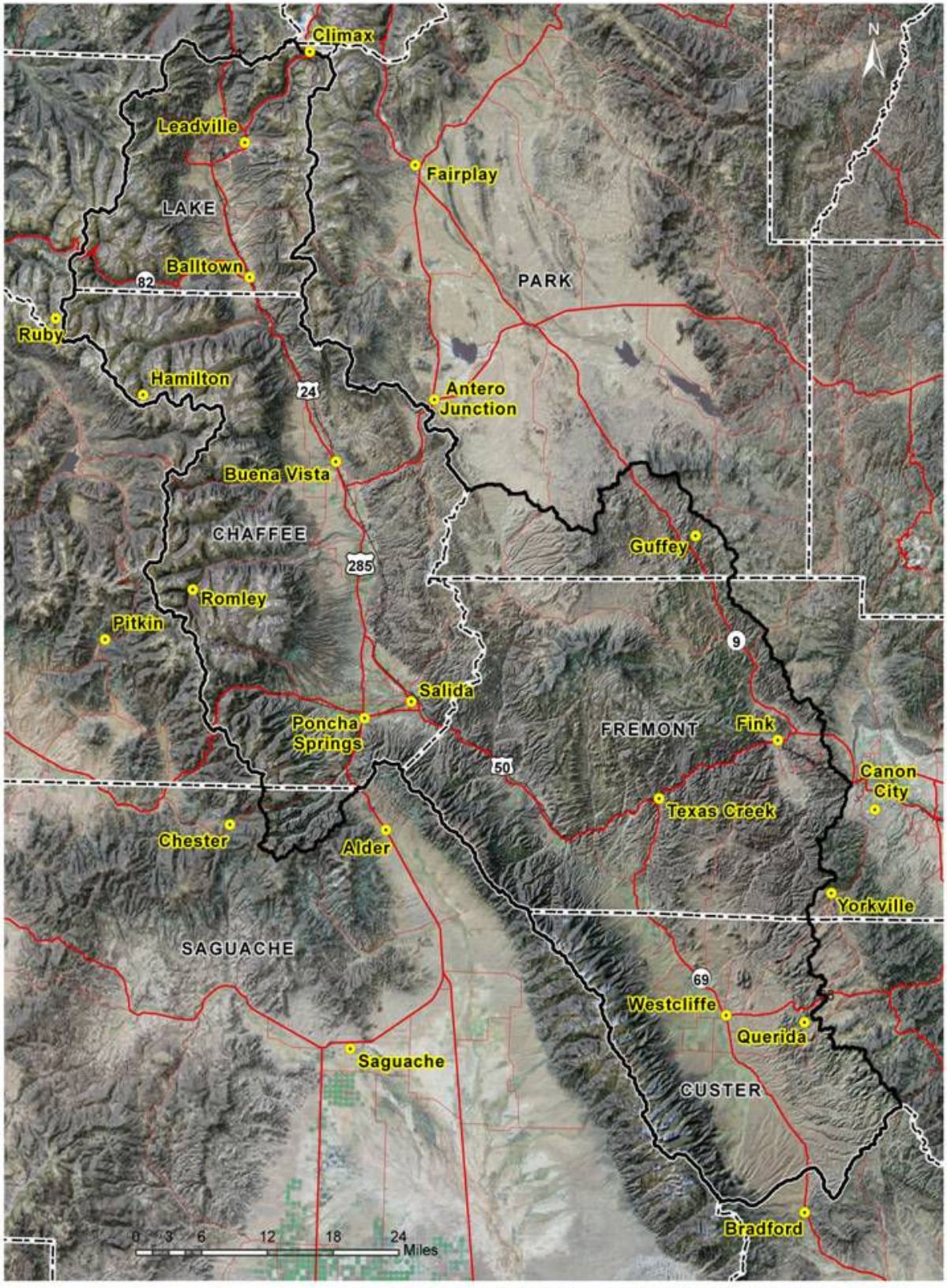
Introduction

The Arkansas Headwaters is



	County Acres	County Acres in ARKANSAS HEADWATERS Watershed	% of county in the Watershed	% of Watershed in the county
Chaffee	645,788	645,301	100%	32.8%
Custer	473,653	324,833	69%	16.6%
Eagle	1,084,004	86	<1%	<1%
Fremont	983,921	602,879	61%	30.8%
Lake	245,639	243,558	99%	12.4%
Park	1,413,689	118,831	8%	6%
Saguache	2,027,649	24,370	1%	1.2%
Summit	395,962	110	<1%	<1%

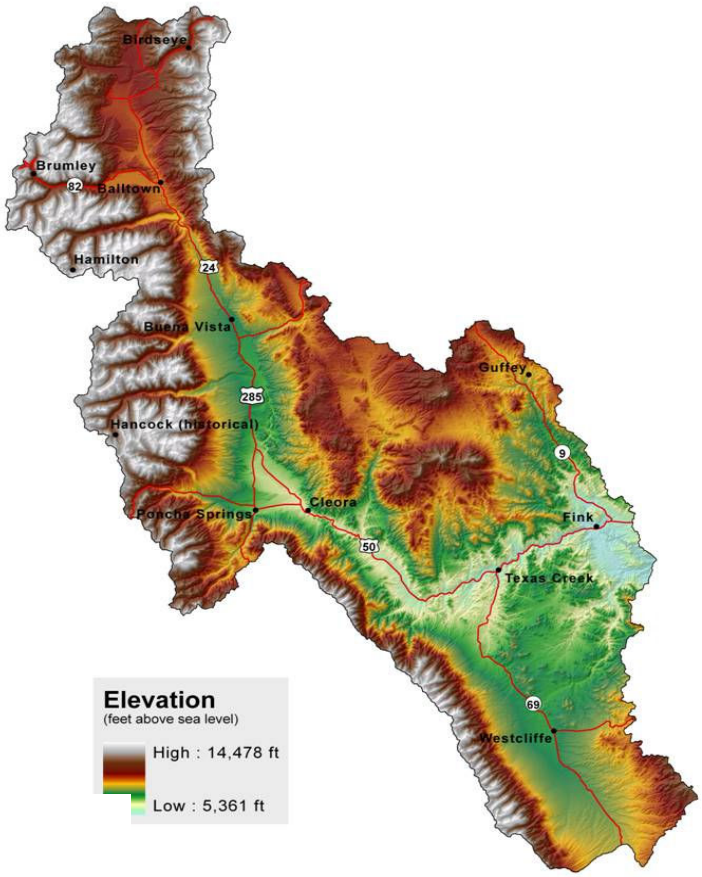
Arkansas Headwaters Watershed - 11020001

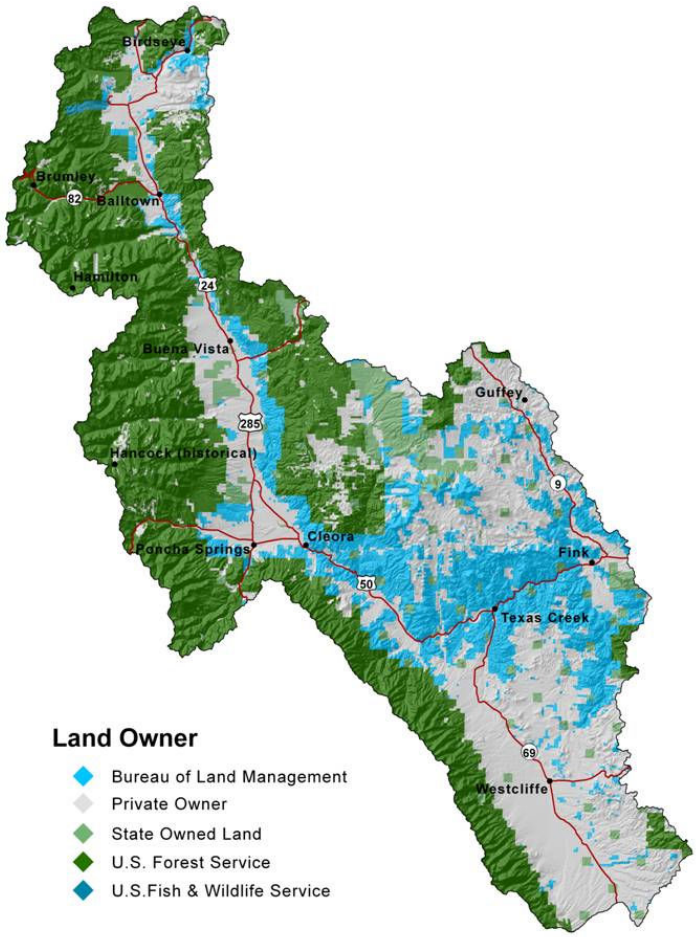


Satellite Imagery: Arc IMS Server - Geography Network Services hosted by ESRI

Common Resource Areas (CRA): Geographical areas where resource concerns, problems, and treatment needs are similar. Landscape conditions, soil, climate, human considerations, and other natural resource information are used to determine the geographical boundaries of the common resource area.

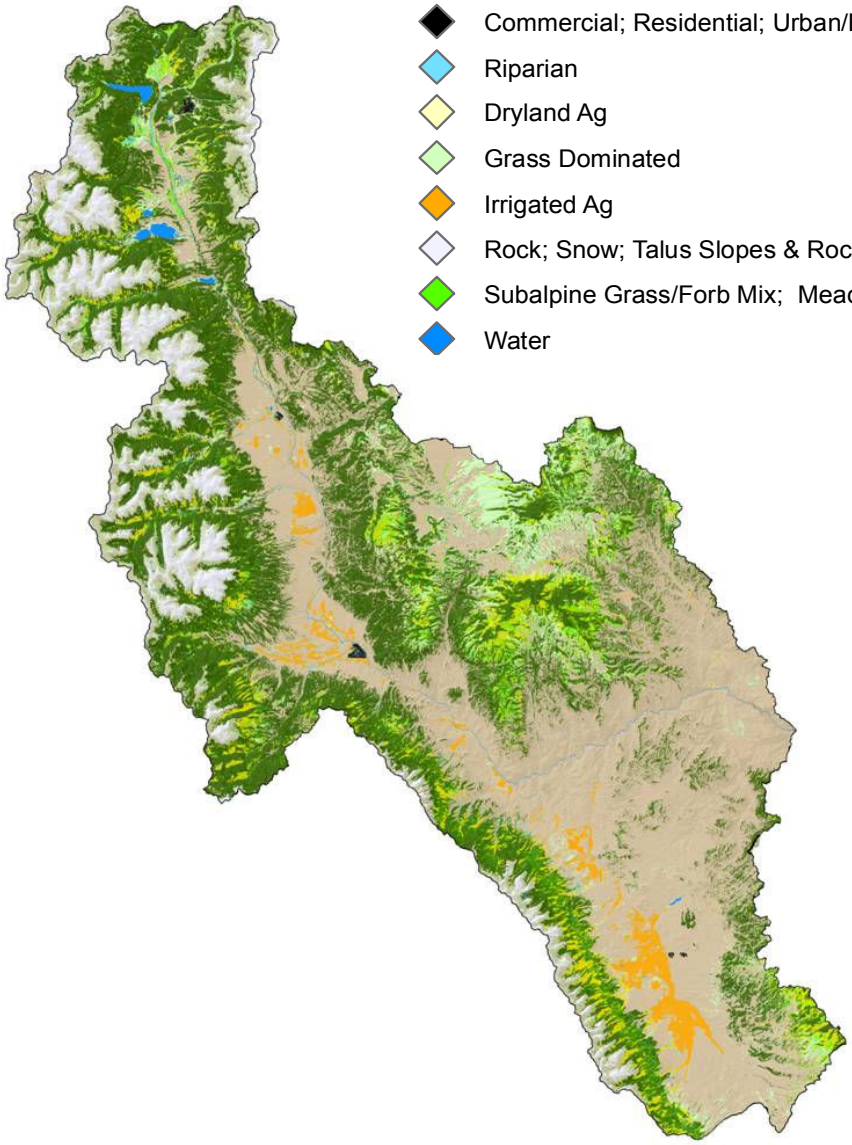
MLRA	CRA	CRA NAME	CRA DESCRIPTION
48	**48A.1**	Southern Rocky Mountains - High Mountains and Valleys	This area is best characterized by steep, high mountain ranges and associated mountain valleys. The temperature regimes are mostly frigid and cryic; moisture regimes are mainly ustic and udic. Vegetation is sagebrush-grass at low elevations, and with increasing elevation ranges from coniferous forest to alpine tundra. Elevations range from 6,500 to 14,400 feet.
48	**48B.1**	Southern Rocky Mountain Parks	This is an area of high elevation intermontane valleys surrounded by the Southern Rocky Mountains. The temperature regimes are mainly cryic, moisture regimes are aridic and ustic. Characteristic vegetation is big sagebrush-grass or grassland. Grazing is the dominant land use
49	**49.1**	Southern Rocky Mountain Foothills	This area is generally a transition between the Great Plains and the Southern Rocky Mountains. The temperature regime is mesic or frigid, and moisture regime is ustic. Characteristic native vegetation ranges from grasslands and shrubs to ponderosa pine and Rocky Mountain Douglas fir forest.





Land Owner	
Bureau of Land Management	357,782
Private	686,357
State	90,059
State, County, City; Wildlife, Parks & Rec.	4,529
U.S. Fish & Wildlife	3,019
U.S. Forest Service	818,527

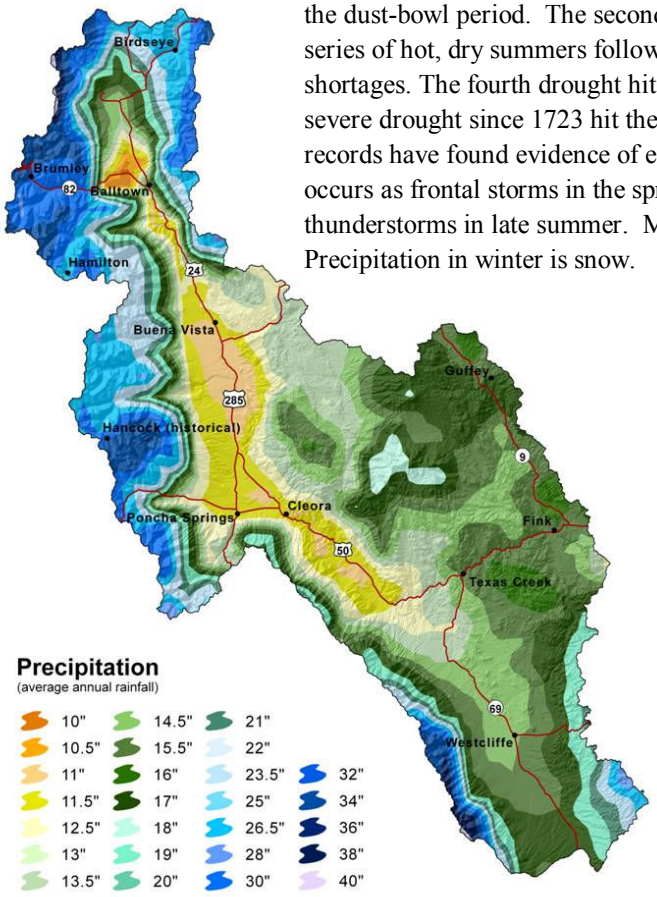
Vegetation

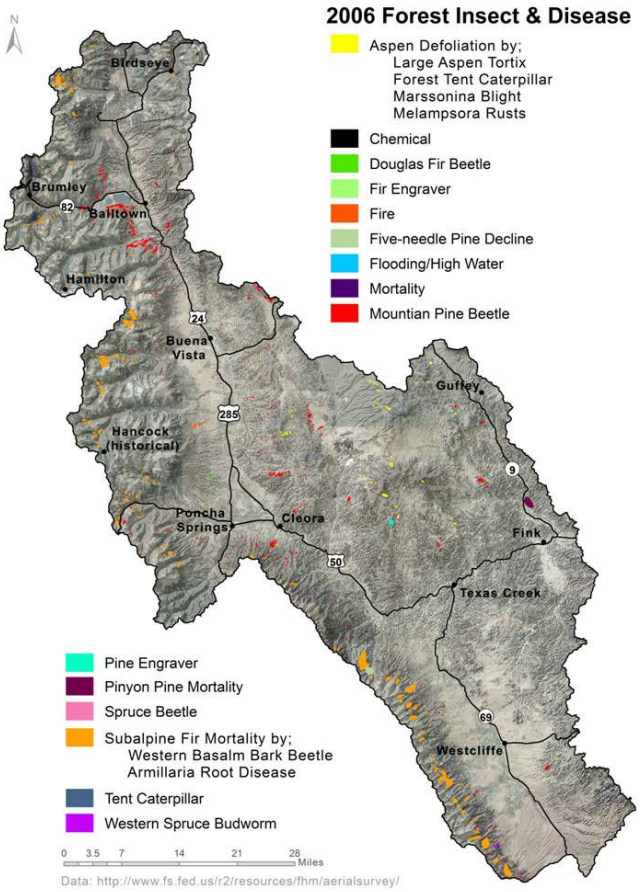


- Agriculture Land
- Alpine Forb Dominated; Grass Dominated; Grass/Forb Mix; Meadow
- Aspen
- Mixed Forest
- Rangeland
- Evergreen Forest
- Commercial; Residential; Urban/Built Up
- Riparian
- Dryland Ag
- Grass Dominated
- Irrigated Ag
- Rock; Snow; Talus Slopes & Rock Outcrops
- Subalpine Grass/Forb Mix; Meadow; Shrub Community
- Water

Land Use	Acreage
Cropland	43,188
Rangeland/Grassland	919,471
Forest	880,448
Riparian	2,994
Water	7,958
Other	106,330
Total Watershed Acres	**1,960,383**

Droughts are regular visitors to the watershed as with the rest of Colorado. Statewide, in the 1900's alone, four prolonged dry spells occurred. There was one in the 1910s. Another, in the '30s, caused the dust-bowl period. The second worst drought on record in the state occurred in the mid-50s. A series of hot, dry summers following a period of scant mountain snowpack created water shortages. The fourth drought hit parts of Colorado in the late 1970s. In this century, the most severe drought since 1723 hit the state in 2002. Prior to the 1700's, researchers looking at tree ring records have found evidence of even more severe droughts, some lasting many years. Rainfall occurs as frontal storms in the spring and early summer and high intensity, convective thunderstorms in late summer. Maximum precipitation is from mid spring through late autumn. Precipitation in winter is snow.



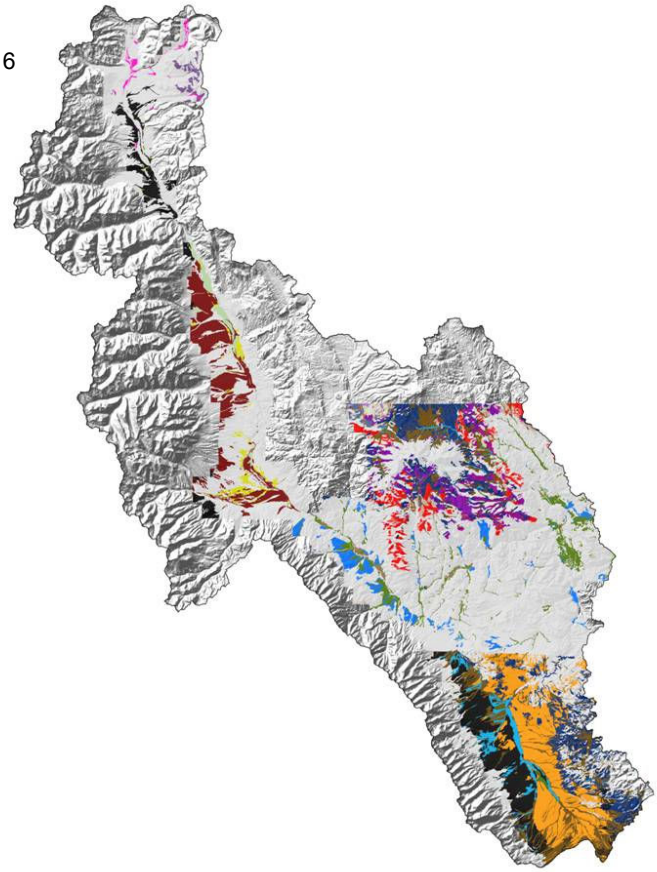


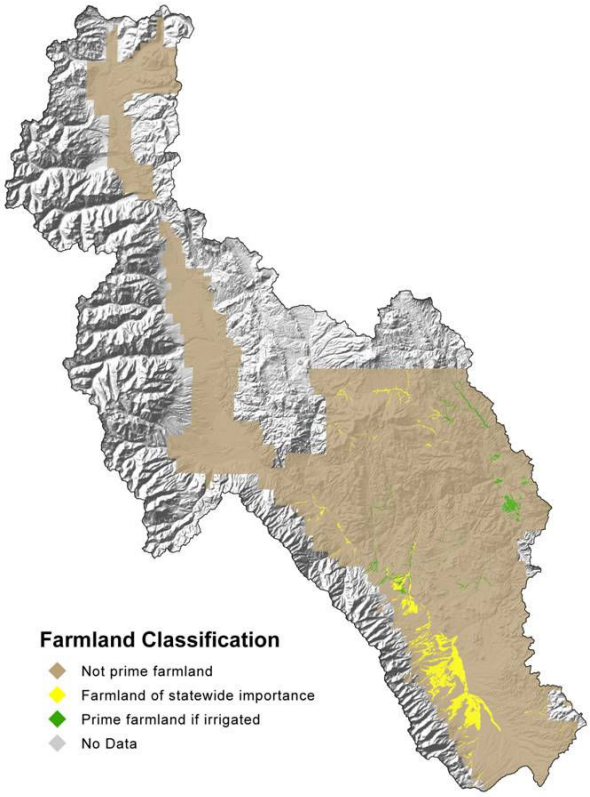
Ecological Sites

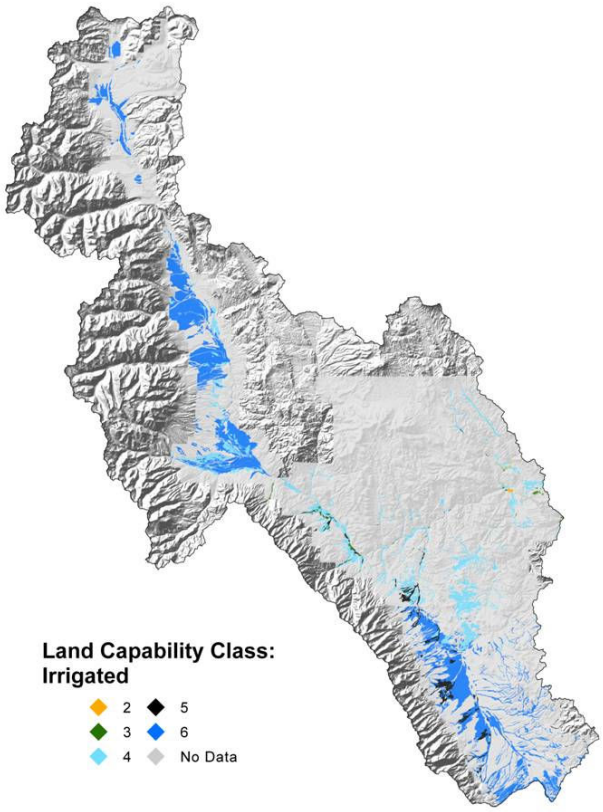
The plant community on an ecological site is typified by an association of species that differs from that of other ecological sites in the kind and/or proportion of species or in total production.

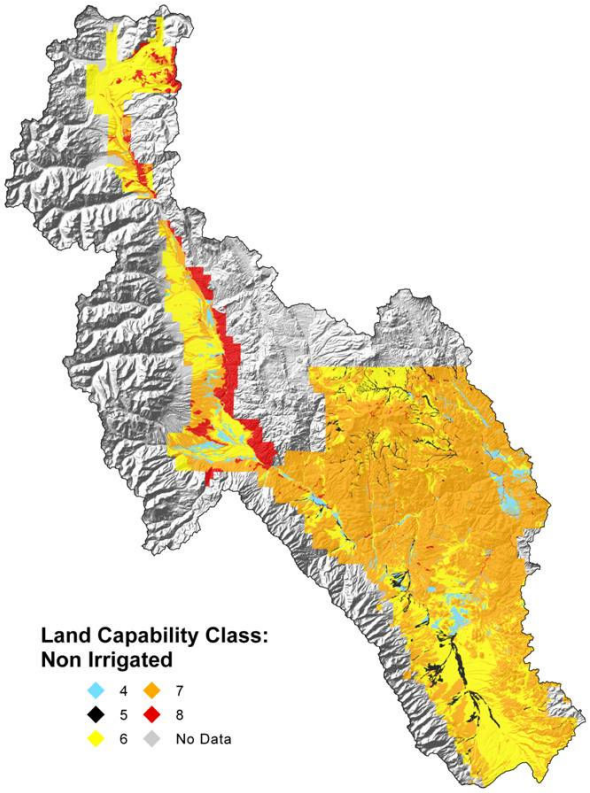
Ecological Site maps give an overall indication of the soils plant relationship in the area. More detailed descriptions of ecological sites are provided in the Field Office Technical Guide (FOTG). The FOTG is available in local offices of the Natural Resources Conservation Service (NRCS) and online at http://www.nrcs.usda.gov/technical/efotg/.

Soil: Ecological Site Name









Land Capability Classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations that show suitability and limitations of groups of soils for rangeland, for woodland, and for engineering purposes.

Capability classes, the broadest groups, are designated by the numbers 1 through 8. The numbers indicate progressively greater limitations and narrower choices for practical use.

Class 1 - soils have few limitations that restrict their use.

Class 2 - soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class 3 - soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class 4 - soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class 5 - soils are subject to little or no erosion but have other limitations, impractical to remove, that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat.

Class 6 - soils have severe limitations that make them generally unsuitable for cultivation and that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat.

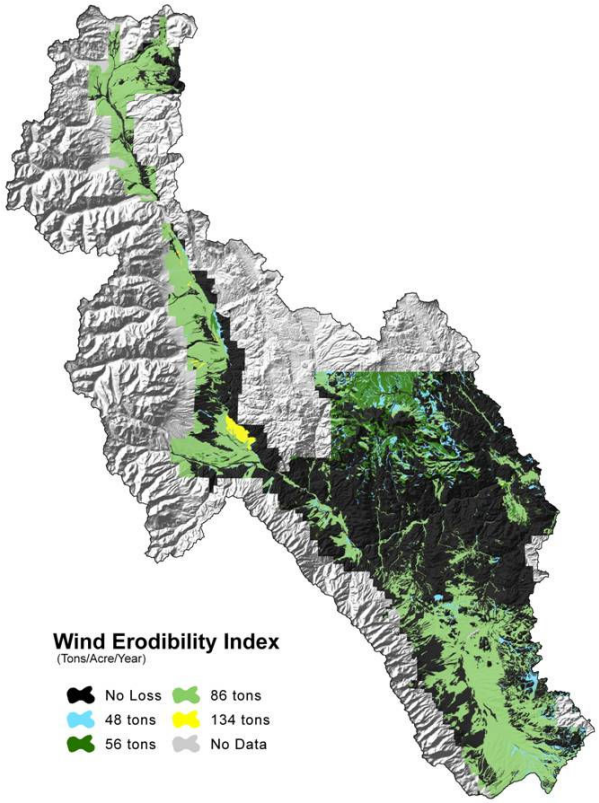
Class 7 - soils have very severe limitations that make them unsuitable for cultivation and that restrict their use mainly to grazing, forestland, or wildlife habitat.

Class 8 - soils and miscellaneous areas have limitations that preclude commercial plant production and that restrict their use to recreational purposes, wildlife habitat, watershed, or aesthetic purposes.

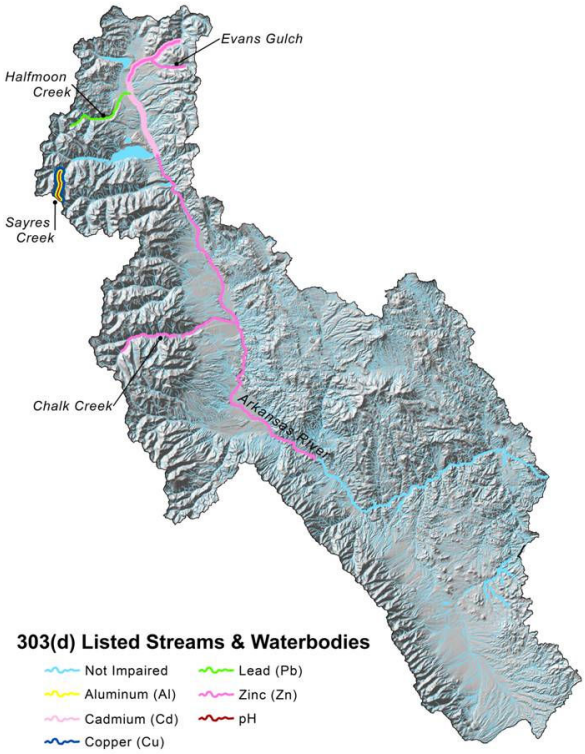
The Wind Erodibility Index (WEI), is a numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion if it is assumed there is no vegetative cover or management.

Soils with an erodibility index equal to or greater than 8 are considered highly erodible.

As shown on the Wind Erodibility Index map below, most soils in the Arkansas Headwaters Watershed are considered highly erodible.



This map shows stream locations within the watershed that are listed on the 303d list. Section 303(d) of the Clean Water Act requires states to identify and list all water bodies where state water quality standards are not being met. Thereafter, TMDLs compromising quantitative objectives and strategies have been or will be developed for these impaired waters within the watershed in order to achieve their water quality standards.



Arkansas Headwaters Watershed Natural Resource Concerns

a. Lake

b. Upper Arkansas

c. Teller-Park

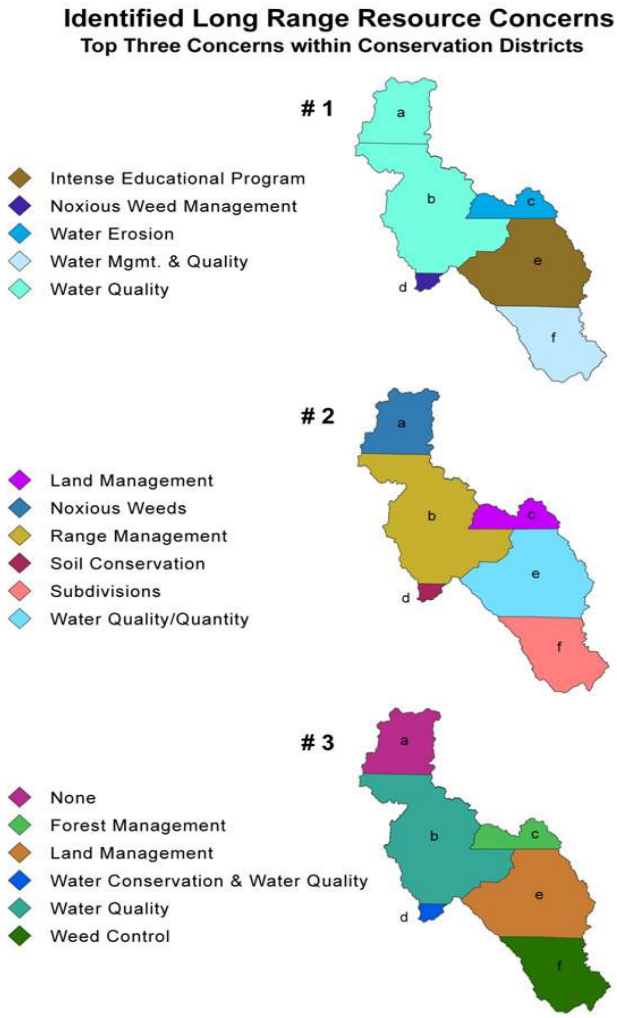
d. Center

e. Fremont

f. Custer County—Divide

Notes:

The Conservation Districts identified and prioritized these resource concerns during facilitated public meetings held between 1998 and 2000 and are part of the Conservation District's Long Range Plans.



II. Other Identified Resource Concerns

Colorado State University

- On-going research in the Arkansas River has increased awareness of the following trends in agriculture and the environment in the river valley:
  - Saline High Water Tables
    Soil Waterlogging/Salinization
    Crop Yield Reduction
  - Salt and Selenium Dissolution in the aquifer
    Substantial return flow of salts and trace metals to the river
  - High Water Tables Under Fallow Land and Invasive Phreatophytes
    Nonbeneficial water consumption

NRCS—Major Land Resource Area Descriptions

- As more agricultural drainage is returned to the rivers, the level of dissolved solids and sediment causes some problems in this watershed.
- Major resource concern in this watershed include wind erosion, soil compaction due to tillage practices, increased salinization of cropland due to irrigation water management practices, and overall degradation of soil quality.

State and Federal Threatened, Endangered, and Candidate Species and Species of Special Concern in Arkansas Headwaters Watershed

Common Name	Scientific Name	Class	State Status/Federal Status	Comments
American Peregrine Falcon	*Falco peregrinus anatum*	Birds	Concern/None	Occurs in the watershed
Arkansas Darter	*Etheostoma cragini*	Fish	Threatened/Candidate	Not currently known, but may occur in the watershed
Bald Eagle	*Haliaeetus leucocephalus*	Birds	Threatened/None	Winters along Arkansas River
Boreal Toad	*Bufo boreas boreas*	Amphibians	Endangered/None	May occur in the watershed
Burrowing Owl	*Athene cunicularia*	Birds	Threatened/None	May occur in the watershed
Canada Lynx	*Lynx canadensis*	Mammals	Endangered/Threatened	May occur in the watershed
Ferruginous Hawk	*Buteo regalis*	Birds	Concern/None	May occur in the watershed
Flathead Chub	*Platygobio gracilus*	Fish	Concern/None	May occur in the lower watershed
Greenback Cutthroat Trout	*Oncorhynchus clarki stomias*	Fish	Threatened/Threatened	Occurs in the watershed
Mexican Spotted Owl	*Strix occidentalis lucida*	Birds	Threatened/Threatened	Occurs near the watershed
Northern Leopard Frog	*Rana pipiens*	Amphibians	Concern/None	Occurs in the watershed
Penland Alpine Fen Mustard	*Eutrema penlandii*	Plants	None/Threatened	May occur in the watershed
Slender Moonwort	*Botrychium lineare*	Plants	None/Candidate	May occur in the watershed
Townsend's big-eared bat (pale ssp)	*Corynorhinus townsendii pallescens*	Mammals	Concern/None	May occur in the watershed
Triploid checkered whiptail	*Cnemidophorus neotesselatus*	Reptiles	Concern/None	May occur in lower part of the watershed
Uncompahgre Fritillary Butterfly	*Boloria acrocnema*	Insects	None/Endangered	May occur in the watershed
Wolverine	*Gulo gulo*	Mammals	Endangered/None	May occur in the watershed

The terrestrial habitat in this watershed ranges from foothills shrub and forest habitats to alpine tundra. Wildlife species found in this watershed are equally diverse. Representative species of the highest elevations include pika, marmot, bighorn sheep, mountain goats, and white-tailed ptarmigan.

Economically important species in the watershed include: black bear, elk, mule deer, mountain lion, and trout, throughout most of the watershed; Merriam's wild turkey in the foothills and montane zones; and pronghorn (antelope) in lower elevation shrub and grasslands.

Riparian areas are important to a number of species providing food, cover, or water at some life stage.

Social Data

County	Chaffee	Custer	Eagle	Fremont	Lake	Park	Saguache	Summit
Demographics (US Census, American Factfinder)								
Total population	16,242	3,503	41,659	46,145	7,812	14,523	5,917	23,548
Male	8,637	1,788	22,813	26,417	4,192	7,510	2,984	13,697
Female	7,605	1,715	18,846	19,728	3,620	7,013	2,933	9,851
Median age (years)	41.8	44.9	31.2	38.8	30.5	40	36.9	30.8
White	14,771	3,359	35,558	41,311	6,062	13,807	4,218	21,626
Black or African American	257	13	142	2464	14	72	7	160
American Indian and Alaska Native	177	39	296	706	98	134	122	112
Asian	71	10	342	232	24	60	27	205
Native Hawaiian and Other Pacific Islander	8	0	30	26	4	4	0	17
Some other race	684	25	4498	564	1405	179	1361	933
Hispanic or Latino (of any race)	1393	88	9682	4776	2823	628	2678	2306
Economic Characteristics (US Census, American Factfinder)								
In labor force (population 16 years and over)	7,142	1,576	26,598	17,107	4,306	8,134	2,666	17,081
Median household income (dollars)	34,368	34,731	62,682	34,150	37,691	51,899	25,495	56,587
Median family income (dollars)	42,043	41,198	68,226	42,303	41,652	57,025	29,405	66,914
Per capita income (dollars)	19,430	19,817	32,011	17,420	18,524	25,019	13,121	28,676
Families below poverty level	323	106	358	881	184	143	291	150
Individuals below poverty level	1737	460	3221	4314	991	803	1325	2098
X means that value is not applicale or not availiable								
County Agricultural Characteristics (Colorado Agricultural Census, county data tables)								
Farms (number)	212	158	114	700	34	217	252	36
Land in farms/ranches (acres)	711,888	121,882	115,998	264,650	17,253	298,286	477,003	27,814
Average size farm/ranch (acres)	336	771	1,018	378	507	1,375	1,893	773
Median size farm (acres)	110	308	181	24	268	288	640	242
Average age of farmer or rancher	54.8	57.8	53.9	55.1	55.2	54.9	54.1	57.6
Net cash return from ag sales ($1,000)	-125	78	1,239	695	-144	-529	24,040	-390
Cattle and calves (number)	6,000	7,000	6,000	11,000		8,000	20,000	2,000

Selected Conservation Application Data	Arkansas Headwaters	11020001				
	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Total
Total Conservation Systems Planned (Acres)	29,348	51,595	na	280,645	21,342	31,673	414,603
Total Conservation Systems Applied (Acres)	27,431	51,638	na	182,105	22,708	31,338	315,220
Practices							
Prescribed Grazing	22,011	28,354	1,584	76,993	15,448	23,736	168,126
Upland Wildlife Habitat Management	18,917	19,060	261	11,099	0	518	49,855
Irrigation Water Management	5,469	1,624	836	1,197	326	874	10,326

Conservation Systems to Address Major Resource Concerns

Primary Resource Concern:	Rangeland Health			
Conservation System Description:	Prescribed Grazing—planned management that provides adequate recovery opportunity between grazing events and proper stocking of animals. Estimate 78,000 (private land) acres to be treated on a median sized ranch of 650 acres.			**Based on Conservation System Guide Code:** CO 48A.1-GR-01-R-Grazing
Practices	**Unit**	**Quantity**	**Cost/Unit ($)**	**Estimated Cost per Median Sized Ranch ($)**
Prescribed Grazing				
Fence (382)	Ft.	4,000	0.6	2,400
Pest Management (595)	Ac.	300	4,500	4,500
Pipeline (516)	Ft.	6,000	2.40	14,400
Upland Wildlife Habitat Management (645)	Ac.	300	na	0
Watering Facility (614)	No.	1	410	410
Windbreak/Shelterbelt Establishment (380)	Ft.	500	.85	425
Costs to apply prescribed grazing per median sized ranch of 650 acres	No.	120	22,135	**$2,656,200**

Conservation Systems to Address Major Resource Concerns (cont'd)

Primary Resource Concern:	**Water Quantity**			
Conservation System Description:	Wild flood system converted to Sprinkler irrigation system with IWM, Forage Harvest Management			**Reference Conservation System Guide Code:** CO 48A.1-HY-Sprinkle-R-1
Practices	**Unit**	**Quantity**	**Cost/Unit ($)**	**Estimated Cost ($)**
Forage Harvest Management (511)	Ac	20,000	na	0
Irrigation System, Sprinkler (442)	Ac	20,000	780	15,600,000
Irrigation Water Management (449)	Ac	20,000	5	100,000
Structure for Water Control (587)	No	1	500	500
			Subtotal Irrigated Crops:	**$15,700,500**

General Effects, Impacts, and Estimated Costs of Application of Conservation Systems

Landuse	**Resource Concern**	**Measurable Effects**	**Non-measurable Effects**	**Estimated Cost ($)**
Rangeland	Plants		Improved plant condition, productivity, health and vigor. Grazing animals have adequate feed, forage, and shelter.	**2,656,200**
Irrigated Crop	Water	56,000 Ac Ft used more efficiently	Nutrients and organics are stored, handled, disposed of, and managed so that surface water uses are not adversely affected.	**15,700,500**
			Estimated Total Costs to Address Major Resource Concerns:	**$18,356,700**

References Not Cited in Document

303(d) listed streams within Big Sandy Watershed were created using data from Colorado Department of Public Health & Environments' Water Quality & Control Commission. Impaired streams are current as of April 30, 2006. For a list of all Colorado impaired streams, locations and priority ratings, visit http://www.cdphe.state.co.us/regulations/wqccregs/100293wqlimitedsegtmdls.pdf.

Threatened and Endangered Species information was gathered using data from the Colorado Division of Wildlife (CDOW) Natural Diversity Information Source (NDIS).

Resource Concerns were identified using the Colorado Association of Conservation Districts' (CACD) long range (10 year) plans from the period of 1996-2000. For more information on Colorado's Conservation Districts, visit http://www.cacd.us.

Maps were generated using Soil Survey Geographic Database (SSURGO) tabular and spatial data. SSURGO data was downloaded for the following Colorado surveys:

Custer County Area (CO635) Published 12/20/2006

Fremont County Area (CO637) Published 12/20/2006

Chaffee-Lake Area (CO658) Published 01/04/2007

Vegetation data was generated using the Colorado Division of Wildlife's "Colorado Vegetation Classification Project" (CVCP) data. visit http://ndis.nrel.colostate.edu/coveg.

Common Resource Area (CRA), a subdivision of the Major Land Resource Area (MLRA), is a geographical area where resource concerns, problems, or treatment needs are similar. For more information on Common Resource Areas visit http://soils.usda.gov/survey/geography/cra.html.

Average Annual Precipitation data was developed through a partnership between the Natural Resources Conservation Service's (NRCS) National Water and Climate Center (NWCC), the National Cartography and Geospatial Center (NCGC), and the PRISM (the Parameter-elevation Regressions on Independent Slopes Model) group at Oregon State University (OSU), developers of PRISM. Mean annual precipitation maps were developed calculating averages of rainfall for the period of 1961-1990. For more information visit http://www.ncgc.nrcs.usda.gov/products/datasets/climate/docs/fact-sheet.html or http://www.ocs.orst.edu/prism.

Land Ownership (status, 2004 dataset) data was obtained from the Colorado Department of Transportation (CDOT). For more information, visit http://www.dot.state.co.us.

Relief & Elevation maps were created using the National Elevation Dataset (NED), 30m Digital Elevation Model (DEM) raster product assembled by the U.S. Geological Survey (USGS). The data was downloaded from the NRCS Geospatial Data Gateway at http://datagateway.nrcs.usda.gov.

Conservation Systems to address major resource concerns were extracted from the Conservation Systems Guides (CSG) compiled from local conservationists by the NRCS Ecological Sciences Section at the Lakewood State Office.

Effects and Impacts of application of conservation systems were extracted from Colorado eFOTG, Section III, Resource Quality Criteria, NRCS, Colorado, March 2005.